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CAGE Scanner: Investigating Surface Backgrounds in HPGe Detectors for LEGEND

A potential source of backgrounds in a ton-scale ^{76}Ge -based neutrinoless double-beta decay program could arise from particle interactions occurring near the surfaces of high purity germanium (HPGe) detectors. The Collimated Alphas, Gammas, and Electrons scanner (CAGE) is a test stand that allows for in-depth studies of surface events by using vacuum-side, collimated radiation sources to characterize the response of HPGe detectors to radiation at specific locations on the detector surface. LEGEND is a search for neutrinoless double-beta decay in the ^{76}Ge isotope that will begin operation of a 200 kg array in 2021, with a plan to scale up to 1000 kg of ^{76}Ge -enriched HPGe detectors in a phased approach. To maximize LEGEND-1000's discovery sensitivity, understanding and discriminating against backgrounds from surface events is essential. In this work we present the design, operation, and current results from CAGE.

Mini-abstract

Novel test-stand aids in understanding of potential surface backgrounds in HPGe detectors for LEGEND

Experiment/Collaboration

LEGEND

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